

# **IMPLEMENTING POST-CONSTRUCTION STORM WATER REQUIREMENTS AND STANDARDS**



# Post-Construction Site

A post-construction site is a construction site that was subject to regulation under NR 151.11 or 151.23, but after construction is completed and final stabilization has occurred



# Applicability & Exclusions

- Applies to:
  - Construction site Notice of Intent (NOIs) received after October 1, 2004
- Exclusions:
  - Redevelopment site with no increase in exposed parking lot or road area
  - Site with less than 10% connected imperviousness provided it has < one acre of cumulative rooftop and parking area
  - Underground utility construction provided it does not create an above ground impervious surface

# Definitions

-  Development
-  By Design
-  Average Annual
-  No Controls

# Definition of “Development”

- “New development” is an undeveloped area including crop land and other vegetated areas
- “Redevelopment” area is where impervious surfaces (buildings, parking lots and roads) already exist
- “In-fill area” is undeveloped land in existing sewer service areas, that is surrounded by developed land or man-made features where development can’t occur



# Definition of “By Design”

- A written stormwater management plan
- Plan must meet NR 151 performance standards and provide justification of MEP where necessary
- Plan must be implemented
- No monitoring of BMP effectiveness required



# Definition of “Average Annual”

- Based on average rainfall year data, not individual storm event
- Specific years selected for use
  - Madison, 1981; Green Bay, 1969; Milwaukee, 1969; Minneapolis, 1959; Duluth, 1975
- Available on website
- Does not include snowfall



# Definition of “No Controls”

- Assumes site is stabilized (no erosion)
- Assumes buildings are in place
- Assumes no stormwater BMPs
- Based on model run of built condition
- No excess credit or “allowance” for conservation design techniques (i.e. street width)





# NR 151

## Post-Construction Requirements

### New Development Requirements

- Written storm water plan
- TSS reduction of:
  - 80% for new development
  - 40% for redevelopment`
- 2-year 24-hour peak flow control
- Infiltration standard
- Protective areas (buffers)
- Fuel & maintenance areas (no sheen)

# Total Suspended Solids (TSS)

On an annual average design basis,  
reduce TSS discharge by:

- New development - 80%
- Redevelopment - 40%
- Project site may be in areas of both new and redevelopment then TSS standard may be prorated (TSS 40 - 80%)

# Total Suspended Solids (TSS)

- In-fill
  - < 5 acres & developed prior to October 2014 - 40%
  - Otherwise - 80%
  - 5-acre in-fill threshold based on undeveloped area available (not amount of land disturbed)

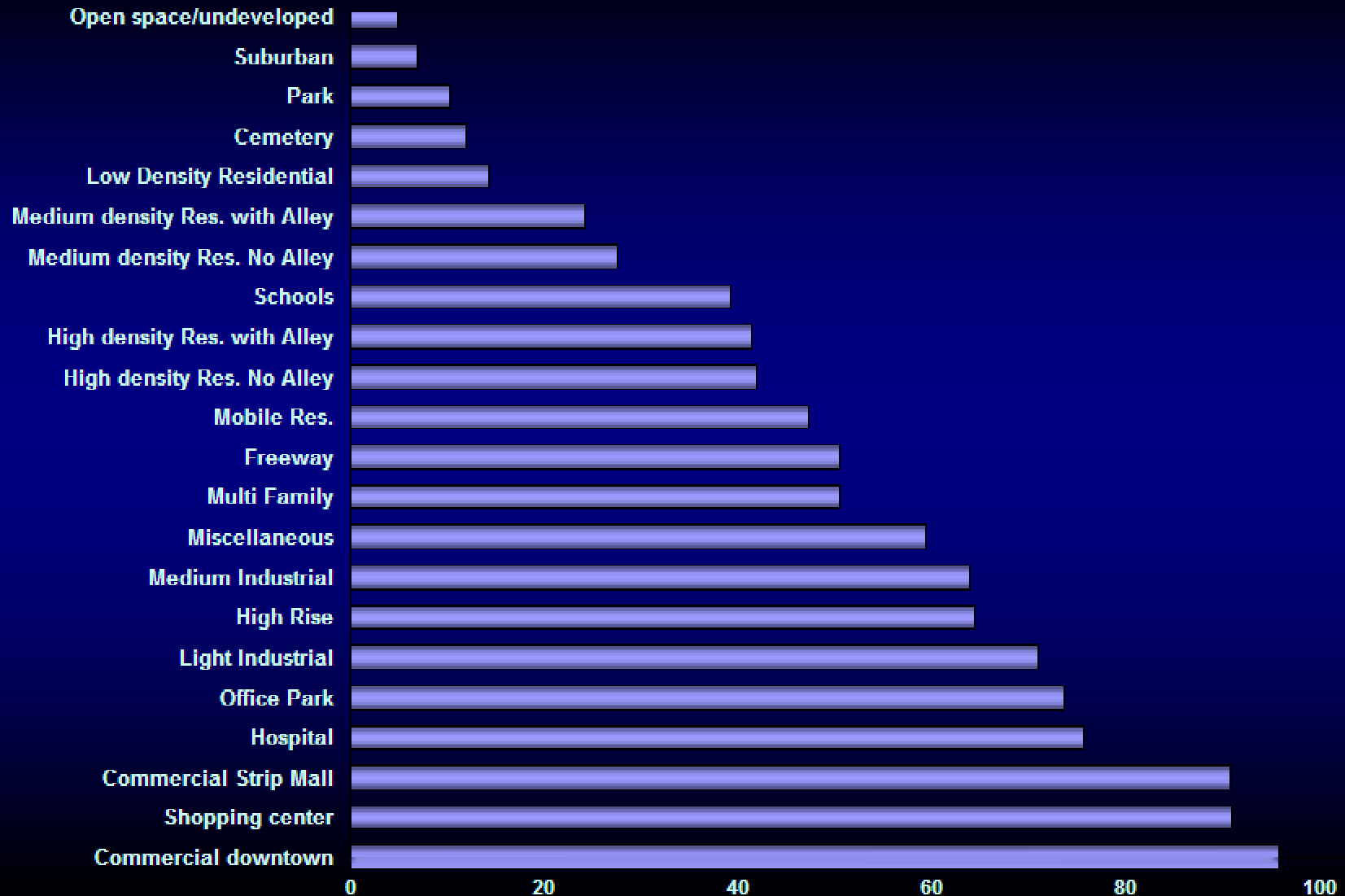
# No Control Conditions

- Base condition for each land use:
  - Based on a percent connected imperviousness
  - Drainage is curb and gutter / storm sewer
- Connected vs Disconnected
  - SLAMM base files developed from observed connectedness for different land uses

# Baseline Condition

- Assumes a “typical” percent connected imperviousness
- Varies with land use
- No credit given for meeting baseline condition
- Volume/pollutant reduction for disconnecting beyond “typical” condition

## % Connected Impervious Values



# **“Disconnecting” Impervious Areas**

## Interim Guidelines for Residential Roofs

- To consider residential roofs as disconnected, the flow path must:
  - Be over a pervious area in good condition
  - Be at least 20' long

# **“Disconnecting” Impervious Areas**

## Interim Guidelines for other surfaces

- Source area flow length may not exceed 75 feet
- Source area and pervious area must be graded for sheet flow
- Pervious area must be:
  - In good condition, not to exceed 8% slope
  - Have a flow length at least as long as the contributing impervious area's length (but never less than 20 feet)

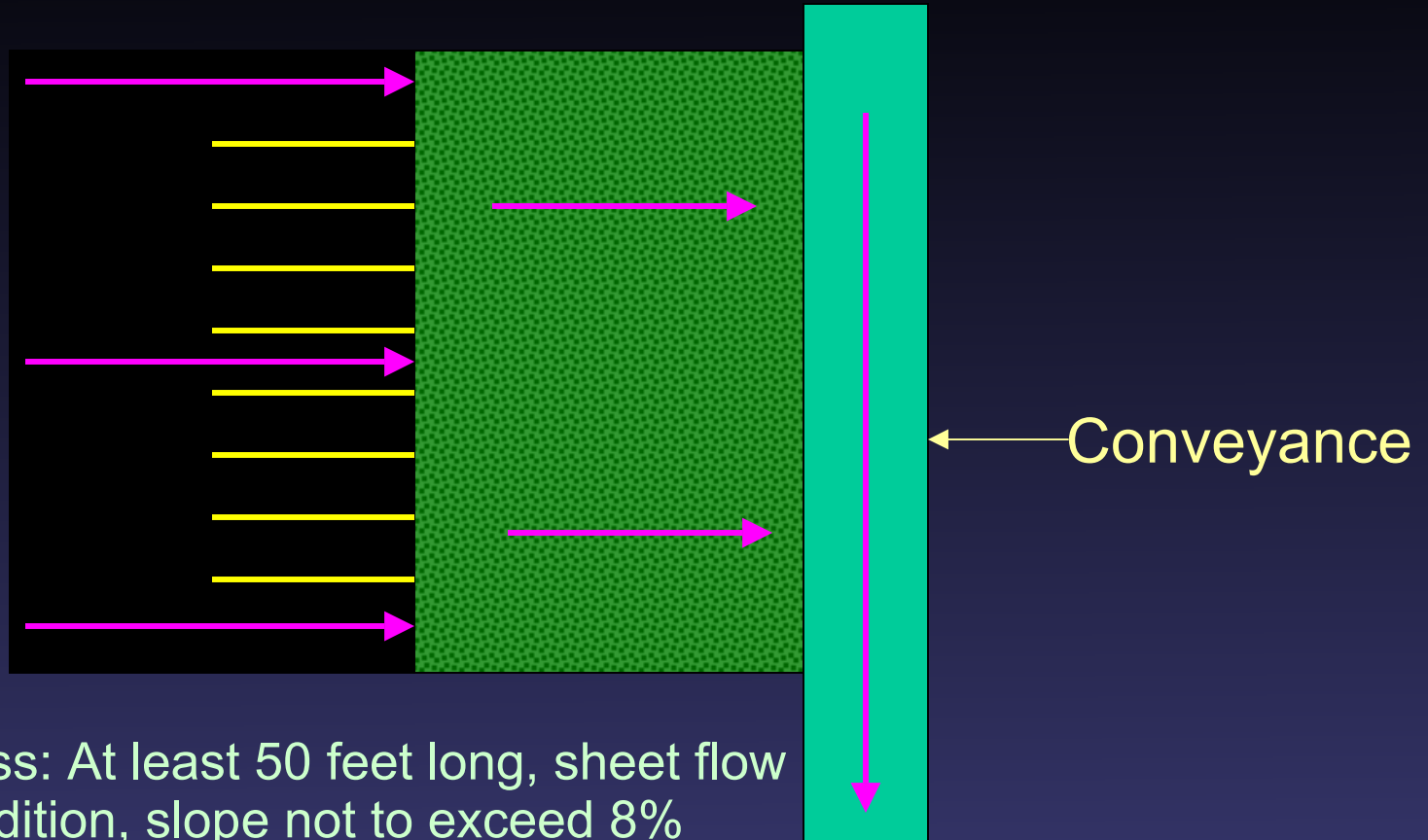


# Residential Rooftop Disconnection



# Parking Lot Disconnection

If Parking Lot: 50 feet long (must have sheet flow)



Then grass: At least 50 feet long, sheet flow good condition, slope not to exceed 8%

# Water Quality Models

- Must be able to calculate pollutant loadings and reductions by BMPs (Examples: SLAMM and P8)
- WinSLAMM and P-8 are not designed to route or evaluate peak flow reductions
- Pondpack, HydroCAD, TR-20, HEC-1, HEC-HMS, SWMM are common tools used to route and evaluate peak flows however these tools are unable to evaluate BMP pollutant removal

# New Development - BMP Credit

- Includes structural practices
- Based on model runs with BMPs
- Can't use street sweeping, catch basin cleaning or other management type BMPs for new development



# Conservation Design Concepts

- Cluster Development leads to less Impervious Areas (less runoff)
- Use of swales instead of sewers
- Attempt to maintain natural hydrology of landscape
- Protect Natural Areas



# Regional Treatment

- Regional ponds are credited under NR 151.12 if:
  - They are not “in” a navigable stream
    - No backwash from 10-year event or less
    - Outside the lateral extent (OHWM to OHWM)
  - They are constructed prior to receiving flows from the development
  - They are designed to handle flows from the development and other contributory areas

# Untreated Areas

- “Site” is the area of land disturbance
- TSS standard is a site standard, not a BMP standard
- Calculate TSS load for entire site under no controls (TL)
- Calculate TSS load reduction for areas captured by BMPs (CL)
  - $CL / TL \geq 80\%$

# Untreated Areas

- If CL/TL is  $< 80\%$ :
  - Increase load reduction in captured areas to offset uncaptured areas if possible
- OR
  - If uncaptured area is back yards (pervious areas) where the flow is by sheet flow to a receiving water this would be considered MEP
  - If uncaptured area is an impervious surface it needs to be captured separately



# Loads from Off-Site Drainage

- Not responsible for TSS reduction from off-site areas draining to the site but must factor in hydrology
- Options
  - Divert off-site drainage
  - Include off-site volume in BMP calculations for proper BMP performance

# New and Redevelopment

- An area weighted calculation:
- Separately calculate total load (TL) under no controls for both new development and redevelopment
- Reduction Load Goal = 40% TL under redevelopment + 80% TL under new development

# EXAMPLE

Site:

- 20 acres of redevelopment as commercial development (assume 2000 lbs/acre TSS)
- 80 acres of new medium density residential (assume 400 lbs/acre TSS)

# EXAMPLE

- Total Load:
  - 20 acres X 2000 lbs/acre TSS = 40,000 lbs
  - 80 acres X 400 lbs/acre TSS = 32,000 lbs
- Total Goal = 72,000 lbs

# EXAMPLE

- Site Load Reduction:
  - 20 acres X 2000 lbs/acre TSS X 40% control = 16,000 lbs
  - 80 acres X 400 lbs/acre TSS X 80% control = 25,600 lbs
- Total Goal = 41,600 lbs

# EXAMPLE

- Percent Load Reduction:
  - $41,600 / 72,000 = 0.58$
  - **58%** control over whole site

# Peak Flow Control

- Reduce peak runoff rates from post-construction conditions to pre-development conditions for the 2-year, 24-hour storm event
- Does not apply to:
  - Sites classified as redevelopment
  - In-fill development < 5 acres
  - Where downstream receiving water elevations in Waters of the State are not increased more than 0.01 feet for 2-year, 24 hour storm event

# Peak Flow Control

- Calculation of Hydrology based on TR-55 methodology or equivalent (Note: Do not use WIN TR-55 until further notification)

- NR 151 maximum CNs for Cropland:

Hydrologic Soil Group	A	B	C	D
TR-55 Curve Number	56	70	79	83

- Use “good” condition CNs for other land uses



# Peak Flow Control

- Rainfall: 2-year, 24-hour storm
  - TP-40 with NRCS Type II Distribution
  - Bulletin 71 Rain Fall Frequency Atlas of Midwest with Huff Distribution (Preferred)
- Adhere to local municipal or county ordinances if stricter (Example: many require use of meadow to represent pre-development conditions)



# Protective Areas (Buffers)



- Must maintain or restore a vegetated buffer along surface waters and wetlands
- Buffer Widths
  - Outstanding & Exceptional Resource Waters (ORW/ERW): 75-foot buffer
  - Lakes & Streams: 50-foot buffer
  - Wetlands: 10 to 75-foot buffer

# Protective Areas (Buffers)

## Wetland Buffer Widths

- Special natural resource interest (NR103.04)
  - Trout streams, endangered/threatened species, fish and wildlife refuges, calcareous fens, wild/scenic rivers
  - 75 feet
- Highly Susceptible Wetlands
  - Sedge meadows, fens, bogs, forested wetlands, fresh wet meadows, shallow/deep marshes, various swamps
  - 50 feet
- Less Susceptible Wetlands
  - Dominated by 90% or greater of an invasive species (i.e. reed canary grass)
  - 10% average wetland width: 10-foot min and 30-foot max

# Protective Areas

- Can the area be disturbed?
  - Yes, as necessary and it must be stabilized from erosion and restored to self-sustaining vegetation
- Can impervious surfaces be in the protective area?
  - Impervious surfaces shall be kept out except in unique circumstances (MEP)
  - Riprap - if needed to prevent erosion
- BMPs such as swales, wet detention basins, etc. are allowed

# Protective Areas

- Exemptions:
  - Redevelopment
  - In-fill less than 5 acres
  - Structures that cross or access surface waters such as boat landings, bridges and culverts
  - Structures constructed in accordance with s. 59.692(1v) [the gazebo clause]
  - Impervious surfaces which drain away from the protective area to another BMP. (Ex. Road with swale parallel to stream)



# Fueling and Vehicle Maintenance Area Standard

- Design, install and maintain BMPs so that runoff that enters waters of the state has no visible petroleum sheen
- BMPs to consider:
  - enclose maintenance areas
  - canopy over fueling areas
  - divert runoff away from fuel/maintenance areas
  - adsorbent spills cleanup supplies
  - oil/water separator treatment
  - other measures as necessary



# Maximum Extent Practicable (MEP)

- If a performance standard is not fully achievable then it must be to the MEP
- Full attainment of a standard is required unless there are unique and site-specific condition(s) that result in MEP being less than full attainment

# Maximum Extent Practicable (MEP)

## Definition takes into consideration:

- Best available technology
- Cost-effectiveness
- Natural and historic resource protection
- Human safety & welfare
- Geographic features
- Varies based on standard and site conditions

# **Examples of MEP (Total Suspended Solids)**

**Construction of a wet basin results in the loss of a few lots from a development. Instead can the primary treatment be done with a proprietary device?**

So far, DNR has found that many proprietary devices do not obtain 80% TSS control and require significant maintenance

# **Examples of MEP (Infiltration)**

**Does runoff have to be pumped upgradient to on-site areas that are suitable for infiltration?**

MEP would be to direct runoff to downgradient areas that are suitable for infiltration. If centralized areas are not suitable for infiltration then decentralized infiltration must be considered.

# **Examples of MEP (Protective Area)**

**A developable area can't be accessed without constructing a road within the protective area. Can this be done?**

MEP would be to construct the road so that it encroaches as little as possible into the protective area and minimize the amount of road runoff that would enter the surface water or wetland without treatment.

# **Examples of MEP (Protective Area)**

**Can parcels be platted within a protective area?**

Buildings, driveways, garages, etc. must be kept outside of protective areas. Thus, plats or lot layouts must be designed so that protective areas remain vegetated. Recommend use of deed restrictions for protective areas.

# Transportation Standards



## Applicability

- State & locally administered highways, airports, harbors, trails & related projects
- Sites with 1+ acre(s) of land disturbance
- Implemented through NR 216 & Trans 401

# NR 216 / CHAPTER 30 PERMITS

- **WisDOT directed and supervised** projects are not regulated under NR 216 or ch. 30, Stats., permits (regulated under TRANS 207 and 401)
- Non-WisDOT projects require NR 216 and ch. 30 permits as appropriate
- Currently, NR 216 permit does not include ch. 30 permit coverage - it is a separate permit



# Transportation Post-Construction Standards

- Written design plan
- TSS controlled by design to MEP up to 80%
- 2-year 24-hour peak flow control
- Highways and some roads exempt from infiltration requirements
- Protective areas (buffers)
- Fuel & maintenance areas (no sheen)

# Transportation Post-Construction Standards

**Do not apply to projects where:**

- Notice of Intent (NOI) received by Oct. 1, 2004
- Road reconditioning or resurfacing
- Redevelopment of parking lots or roads that have no increase in impervious area
- Minor reconstruction of a highway (except protective area requirement applies)

# Minor Reconstruction of a Highway

“Minor reconstruction” means reconstruction that is limited to 1.5 miles in continuous or aggregate total length of realignment and that does not exceed 100 feet in width of roadbed widening. This is intended to include:

- adding a turning or passing lane at an intersection
- adding a traffic merge lane/ramp
- road straightening at a hazardous intersection

# Transportation Post-Construction Standards

**Do not apply to project where:**

- Project site has less than 10% imperviousness and less than 1 acre cumulative parking lot and rooftop area
- Routine maintenance that involves less than 5 acres of land disturbance if performed to maintain the original line and grade, hydraulic capacity or original purpose of the facility

# Transportation Swale Treatment

- Swale treatment is considered a MEP practice for most transportation facilities. Swale must:
  - Be vegetated to prevent erosion and provide treatment
  - Carry a 2-year design storm  $< 1.5$  fps for 200 feet or greater
- ORW, ERW, 303d impacted receiving waters may require more than swale treatment

# Storm Water Management Plan

## NR 216.47

- SWMP must:
  - Meet appropriate NR 151 performance standards
  - Include a description of the practices that will be installed and why selected
  - Utilize DNR-approved technical standards and justify deviation where performance affected
  - Infiltration systems require:
    - setbacks from wells
    - on-site testing for GW protection and design concerns
  - Long-term maintenance agreement required for permanent structures and submitted with NOI

# Long-Term Maintenance & Enforcement

- NR 151 and NR 216 require construction of BMPs and maintenance of devices
- Long-term maintenance required by NR 151 beyond the NR 216 permit termination date
- Methods of enforcement:
  - DNR through referral
  - Local enforcement

Questions?